(12) UK Patent Application (19) GB (11) 2 347 716 (13) A

(43) Date of A Publication 13.09.2000

(21) Application No 9927296.5

(22) Date of Filing 19.11.1999

(30) Priority Data
(31) 9905664.0 (32) 12.03.1999 (33) GB

(71) Applicant(s)
The Electric Motor Company Limited
(Incorporated in the United Kingdom)
Rushington Business Park, Totton, SOUTHAMPTON, SO40 9AH, United Kingdom

(72) Inventor(s)
Derek Neilson Ferrier
Jeremy Russell

(74) Agent and/or Address for Service
Barker Brettell
Medina Chambers, Town Quay, SOUTHAMPTON, SO14 2AQ, United Kingdom

(51) INT CL[7]
F04D 13/14 13/06 13/08

(52) UK CL (Edition R)
F1C CA CBC CFAB CFAC CFWB C104 C204 C422 C601
U1S S1103

(56) Documents Cited
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(58) Field of Search
UK CL (Edition R) F1C CA CBC CBD CBG CBH CFAB CFAC
INT CL[7] F04D 13/00 13/02 13/04 13/06 13/08 13/12 13/14
ONLINE: EPODOC,JAPIO,WPI

(54) Abstract Title
Pumping assembly having a motor driving a plurality of pumps

(57) A pumping assembly for a drinks temperature management system comprises an electric motor 2 driving pumps 5, 6, 7 submerged in a chilled water reservoir 4 via vertical drive shaft 3. Each pump 5, 6, 7 comprises an impeller 12 within a pump casing 14 formed with a fluid input port 16 and a fluid output nozzl 18. The pumps are separated by a set of rods 9, 9'. Connected to respective output nozzles 18 are cooling tubes 20, 21, 22 for feeding three separate drink python bundles with chilled water which is then returned to the reservoir 4. A vaned agitator 8 may be disposed at one end of the drive shaft 3. In use, motor 2 runs continuously. Alternatively, the drive shaft may be horizontal (fig 2), the motor submerged with drive shafts extending in opposite directions (fig 3), or the drive being via a magnetic coupling (figs 4 and 5) when the fluid pumped is intended for consumption.

FIGURE 1.

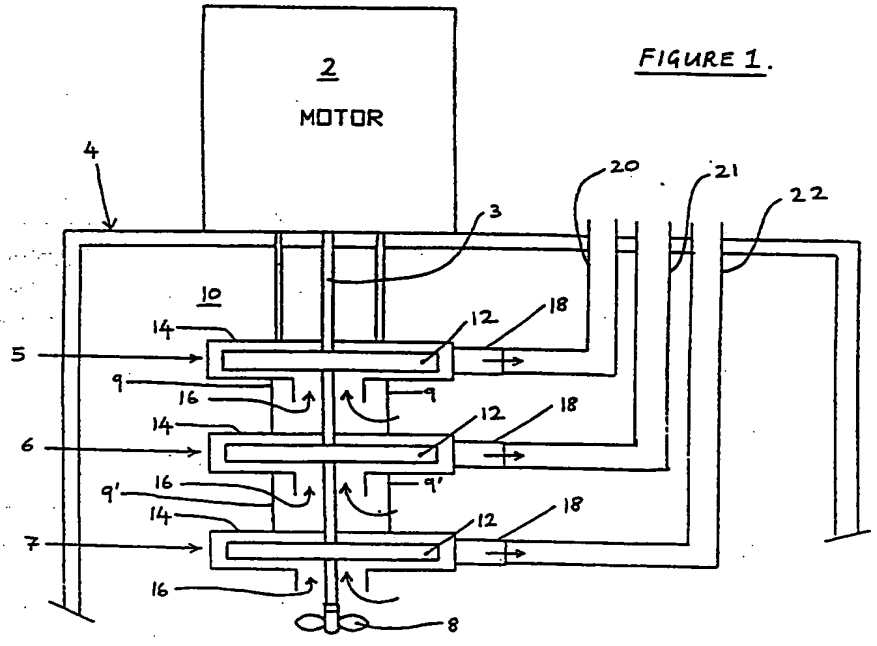

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FIGURE 1.

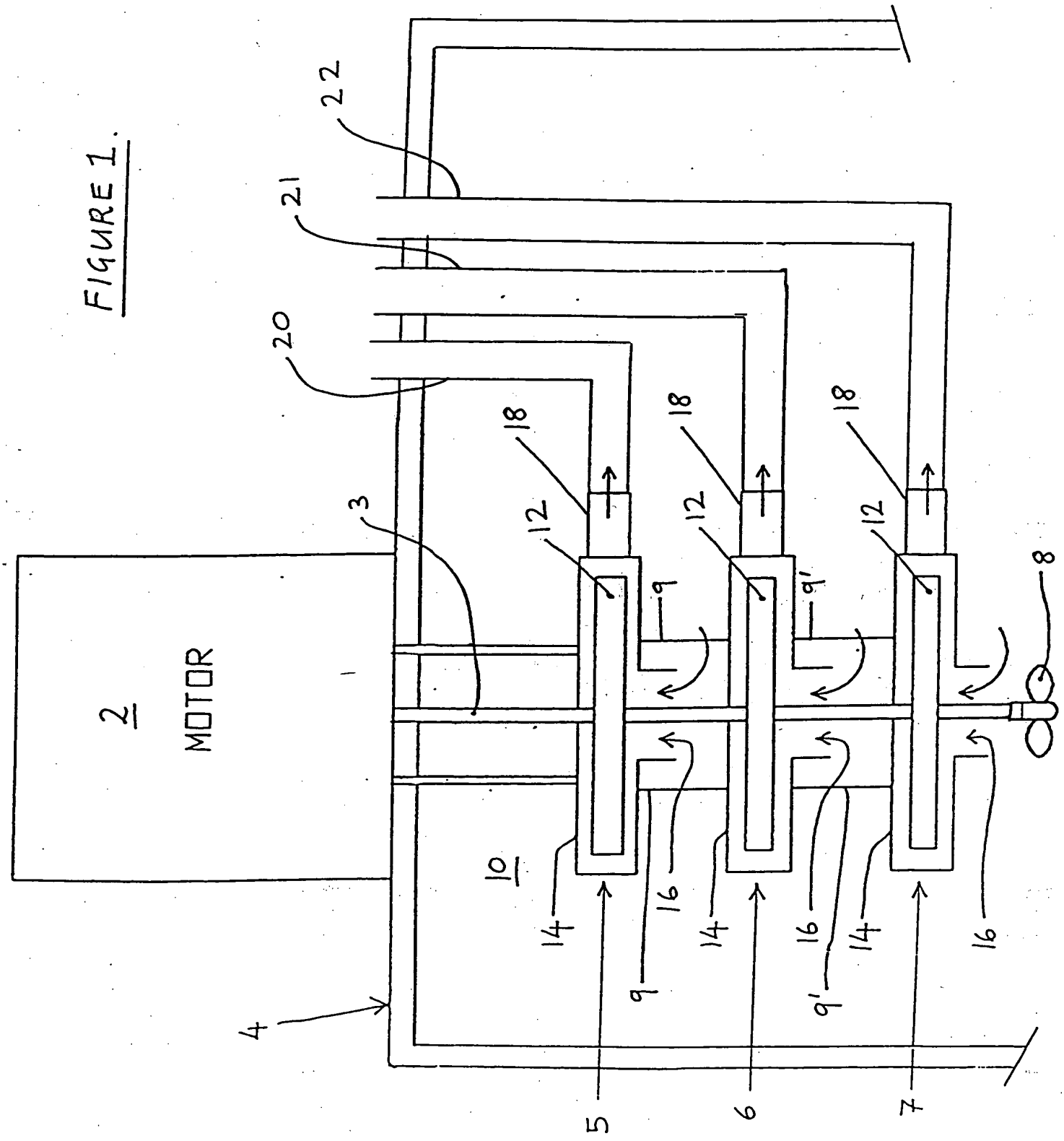
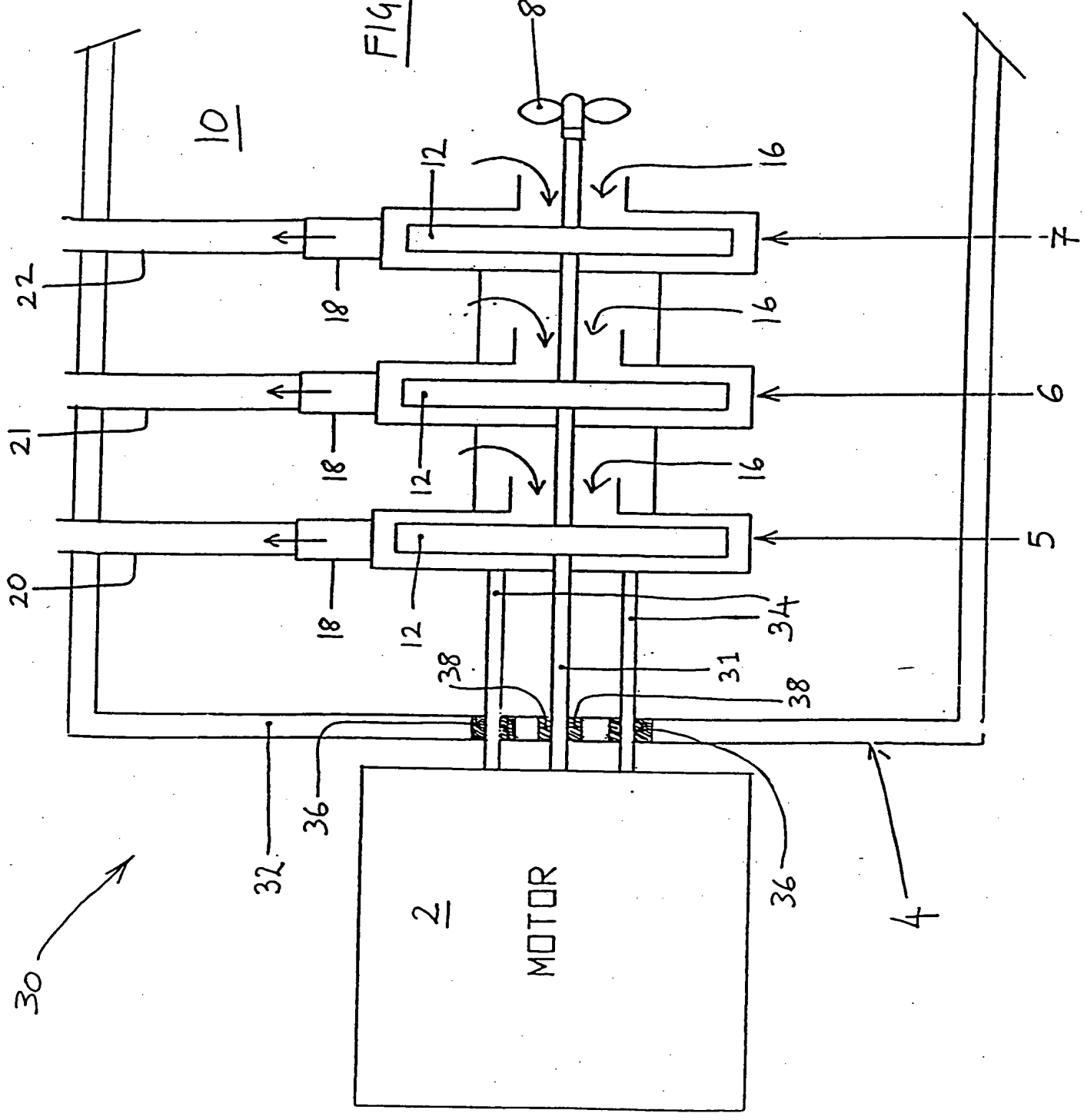


FIGURE 2.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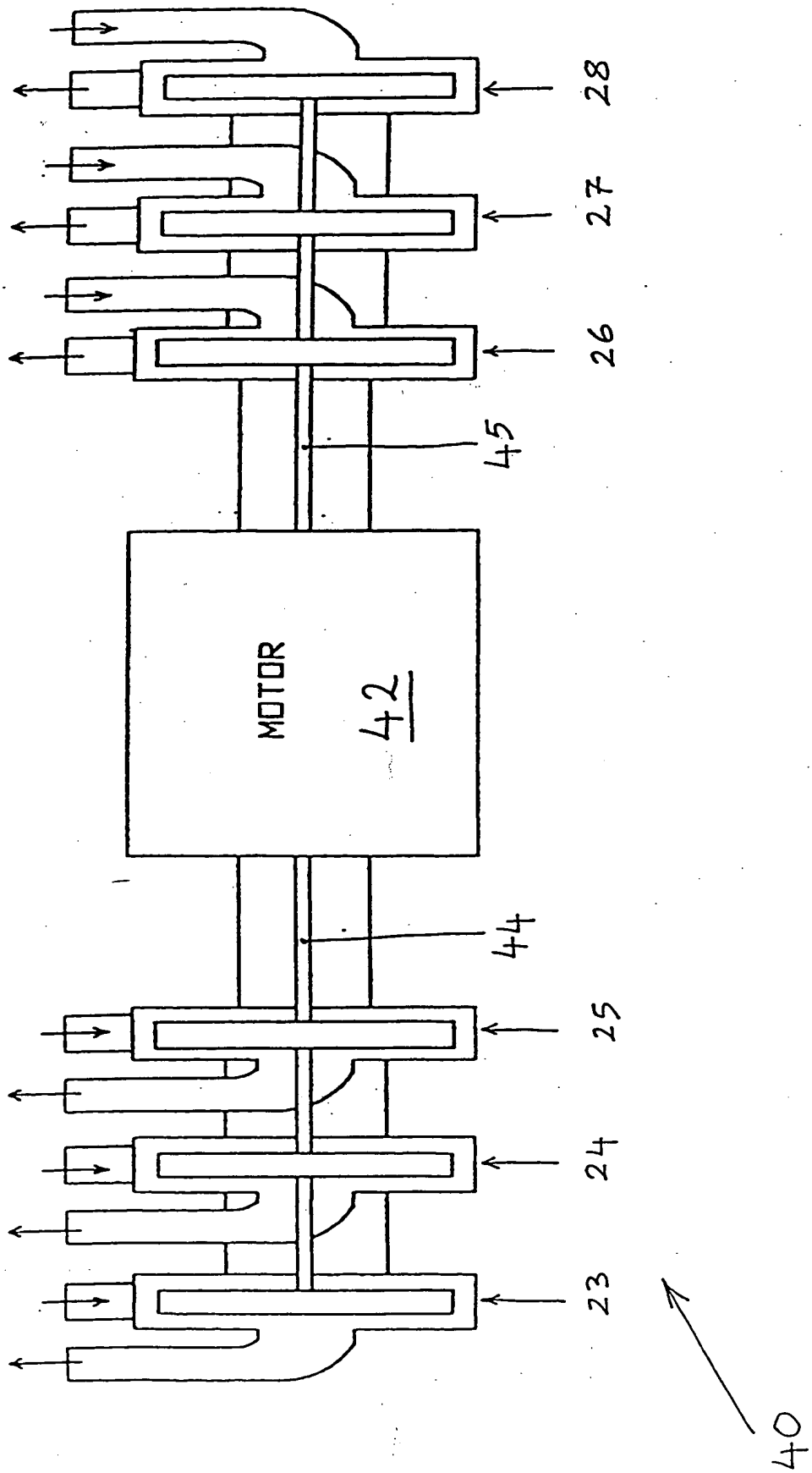
MOTOR
4
30

FIGURE 3.



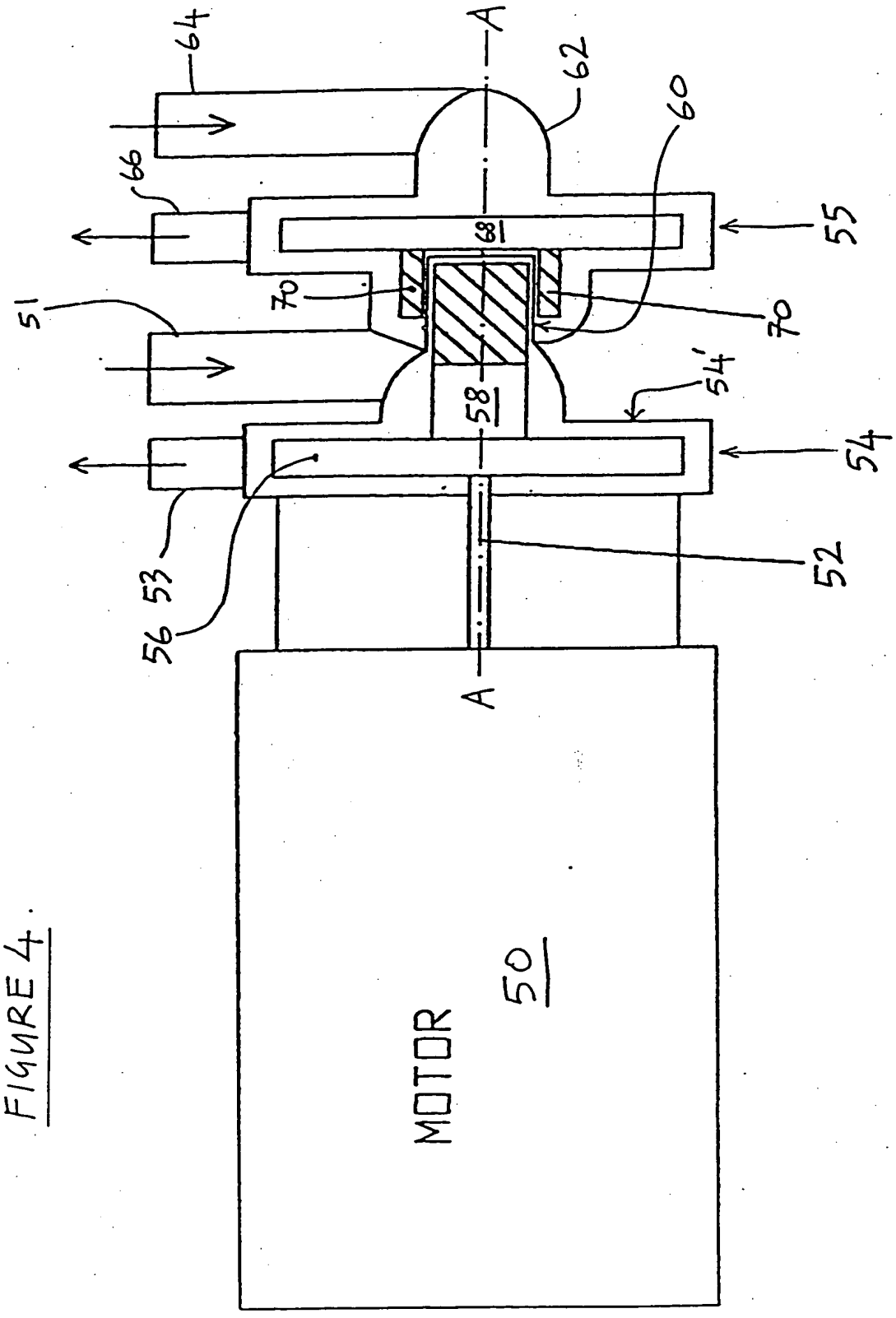


FIGURE 4.

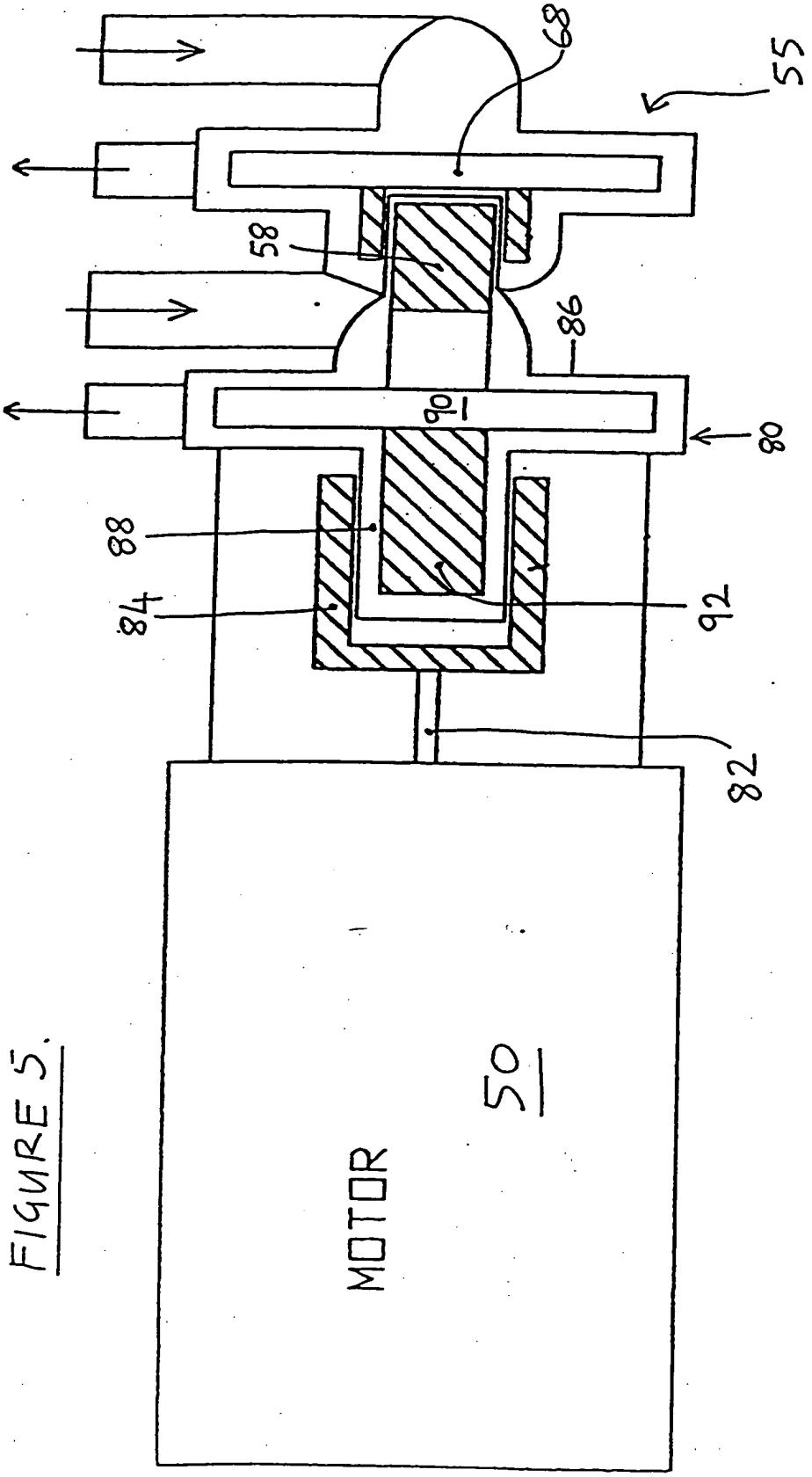


FIGURE 5.

PUMPING ASSEMBLY FOR A DRINKS TEMPERATURE MANAGEMENT SYSTEM

The present invention relates to a pumping assembly for a drinks temperature management system and more particularly to a pumping assembly for a cooling system for a flow of media such as drinks.

In existing drinks supply systems there is provided a bundle of drink carrying tubes that are kept cool by a tube carrying re-circulated chilled water. The drink carrying tubes and cooling tube are bundled together and encased within an insulating cover. The collection of tubes and insulating cover is called a 'python'. At present each python may be supplied with chilled water from a reservoir of chilled water via a single fluid pump driven by an electric motor. Alternatively, the cooling tube is a continuous loop containing cooling water which is re-circulated through the tube. Part of the cooling tube passes through the reservoir of chilled water. The cooling water is circulated through the tube by a single fluid pump driven by an electric motor

According to a first aspect of the present invention there is provided a pumping assembly for a drinks temperature management system, the pumping assembly comprising a motor including drive output means which drives a plurality of pump means.

The plurality of pump means may be used to provide a plurality of pythons with chilled fluid.

Each pump means preferably comprises fluid input means providing fluid access to an impeller and fluid output means.

Preferably the fluid input means is a fluid port. Also preferably the fluid output means is a fluid port.

Preferably the drive means is coupled to each impeller of the pump means.

Preferably the drive means comprises a rotatable output drive shaft directly coupled to each impeller of the pump means. Alternatively, at least one of the impellers is not in direct contact with the drive means but is magnetically coupled to the drive means.

The fluid output port discharges chilled fluid from the pump means. The discharged fluid is circulated through distribution tubes throughout the drinks cooling system.

According to a second aspect of the present invention there is provided a pumping assembly for a drinks temperature management system, the pumping assembly comprising a motor including two drive output means which drive a plurality of pump means.

Preferably each drive output means comprises a rotatable drive shaft coupled to one or more of the pump means. Each of the pump means may be directly coupled to either of the drive shafts. At least one of the pump means may be magnetically coupled to either of the drive shafts.

The pumping assembly may also comprise fluid agitating means coupled to the drive shaft. The fluid agitating means is normally used within a reservoir of chilled fluid.

The present invention may be carried into practice in various ways, but embodiments will now be described, by way of example only, with reference to the accompanying drawings in which:

Figure 1 is a schematic vertical cross-section of the motor/drive means/pump means of a first embodiment of a pump assembly for a drinks cooling system in accordance with the present invention,

Figure 2 is a schematic vertical cross-section of a second embodiment of the motor/drive means/pump means of a pump assembly for a drinks cooling system in accordance with the present invention,

Figure 3 is a schematic vertical cross-section of a third embodiment of the motor/drive means/pump means of a pump assembly comprising two drive shafts for a drinks cooling system in accordance with the present invention,

Figure 4 is a schematic vertical cross-section of a fourth embodiment of a motor/drive means/pump means of a pump assembly comprising a magnetic coupling arrangement for a drinks cooling system in accordance with the present invention, and

Figure 5 is a schematic vertical cross-section of a fifth embodiment of a motor/drive means/pump means of a pump assembly comprising two magnetic coupling arrangements for a drinks cooling system in accordance with the present invention.

The pump assembly of Figure 1 comprises an electric motor 2 including a vertical drive shaft 3, three centrifugal fluid pumps 5, 6, 7 and a vaned agitator 8. The electric motor 2 is located above a chilled water

reservoir 4. The drive shaft 3 extends downwardly in a direction away from the motor through the top of the reservoir 4 and into chilled water 10 contained by the reservoir 4. The vaned agitator 8 is disposed at the lowermost distal end of the drive shaft 3. The three fluid pumps 5, 6, 7 are directly coupled to the drive shaft 3 and are disposed vertically above the agitator 8. The pumps 5, 6, 7 are submerged with the chilled water 10.

The pumps 5, 6, 7 each comprise an impeller 12 contained within a disc shaped hollow pump casing 14. Each pump casing 14 is formed with a fluid input port 16 and a fluid output nozzle 18 extending axially from the drive shaft 3. The pump 5 is held separated from pump 6 by a set of rods 9 and pump 6 is held separated from pump 7 by a set of rods 9'. Connected to the respective output nozzles 18 are cooling tubes 20, 21, 22. The respective cooling tubes 20, 21, 22 are fed to three separate drink python bundles.

In use the motor 2 runs continuously and rotates the drive shaft 3 which in turn rotates the three impellers 12 and the agitator 8. Each impeller 12 draws chilled water 10 from the reservoir 4 through the input ports 16. The chilled water exits the respective pumps 14 through the output nozzles 18. The chilled water is circulated through the drinks pythons via the cooling tubes 20, 21, 22 and then returned to the reservoir 4.

The pump assembly of Figure 2 comprises substantially the same features of the assembly shown in Figure 1 and the same reference numerals have been used for those features that are common to both assemblies. Figure 2 shows the pump assembly of Figure 1 rotated anticlockwise by 90 degrees. The pump assembly 30 of Figure 2 comprises an electric motor 2 including a horizontal drive shaft 31, three centrifugal fluid

pumps 5, 6, 7. The electric motor 2 is located adjacent the side wall 32 of the chilled water reservoir 4. The drive shaft 3 extends horizontally in a direction away from the motor 2 through the side wall 32 of the reservoir 4 and into chilled water 10. The pump 5 is held spaced from the motor by a set of rods 34. A set of seals 36 are disposed between the rods 34 and the side wall 32 to provide a fluid seal. A further seal 38 is disposed between the drive shaft 3 and the side wall 32.

The pump assembly of Figure 3 comprises a submerged pump assembly 40 comprising an electric motor 42 including two horizontal drive shafts 44, 45, six centrifugal fluid pumps 23, 24, 25, 26, 27, 28. The pump assembly 40 is submerged within a chilled water reservoir (not shown). The two drive shafts 44, 45 horizontally extend in the direction opposite from each other. The respective impellers of pumps 23, 24, 25 are directly coupled to the drive shaft 44 and the respective impellers of pumps 26, 27, 28 are directly coupled to the drive shaft 45.

The pump assembly of Figure 4 comprises an electric motor 50 including a horizontal drive shaft 52 and two centrifugal pumps 54, 55. The pump assembly may be submerged within a reservoir of chilled water (not shown). Alternatively, the motor 50 or even the whole pump assembly may located outside a reservoir of chilled water with the chilled water being supplied via tubing.

The pump 54 comprises a pump housing 54' formed with a fluid input nozzle 51 and a fluid output nozzle 53 and each nozzle extends in a direction radially from the axis of the drive shaft 52. Contained within the pump housing 54' is a pump impeller 56.

The drive shaft 52 extends horizontally in a direction opposite to the motor 50. The distal end of the drive shaft 52 is connected to the

impeller 56 of the pump 54. The impeller 56 includes a cylindrical driver magnet 58. The driver magnet 58 extends coaxially with drive shaft 52 in a direction opposite to the motor 50. The distal end of the driver magnet 58 is received by a cup-shaped partition 60. The cup-shaped partition 60 separates the internal fluid chambers of the pump 54 and the pump 55. The impeller 56 and magnet 58 are rotated by the drive shaft 52 about a common axis A-A.

The pump 55 comprises a pump housing 62 formed with a fluid input nozzle 64 and a fluid output nozzle 66 each nozzle radially extends in a direction from the axis A-A of the drive shaft 52. Contained within the pump housing 62 is a pump impeller 68. The pump impeller 68 comprises a cylindrical driven magnet 70 that extends in a direction towards the motor 50. A substantial portion of the cup-shaped driven magnet 70 overlaps the cup-shaped partition 60 and the distal end of the driver magnet 58.

The driver magnet 58 and the driven magnet 70 are provided with magnetic poles which interact with one another to provide a magnetic coupling across the cup-shaped partition 60 whereby the impeller 68 inside the pump 55 is driven in use by the rotation of the magnet 58. Because the impeller 68 of pump 55 is driven by a magnetic coupling arrangement, the pump 55 is effectively a sealed unit. There is no need for any fluid seals for the moving parts of pump 55. The sealed unit of pump 55 is especially useful when fluid that is intended for consumption is being pumped, because there is less likely to be a leak or contamination of the drinkable fluid.

In use the motor 50 will run substantially continuously. The impellers 56, 66 provide means to circulate chilled water or drinkable fluid through separate drink pythons.

The pump assembly of Figure 5 comprises an embodiment of the pump assembly shown in Figure 4 wherein the pump assembly includes a second sealed centrifugal pump 80. Features common to both the embodiments shown in Figure 4 and Figure 5 have the same reference number.

In the embodiment of Figure 5 the drive shaft 82 comprises a cup-shaped drive magnet 84 at the distal end of the shaft 82. The centrifugal pump housing 86 of pump 80 is formed with a second cup-shaped partition 88. The impeller 90 of the pump 80 comprises a driven cylindrical magnet 92 in addition to the driver magnet 58. The driven magnet 92 extends substantially into the cup-shaped partition 88. The cup-shaped drive magnet 84 substantially overlaps both the partition 88 and the driven magnet 92 whereby a magnetic coupling is achieved.

In use the rotational motion of the drive shaft 82 will be transferred to the impellers of the pump 80 and the pump 55 by the magnetic coupling arrangement.

It will be appreciated that the present invention should not limited to any particular number of pumps or arrangement of pumps. Any practical combination of directly coupled and/or magnetically coupled pumps can be driven from a single motor. A single motor may drive multiple pumps which supply multiple pythons.

The pumps may provide chilled water, still drinkable fluid or carbonated drinkable fluid to multiple pythons. The size of the pumps may also vary so that different volumes of fluid and different rates of fluid flow may be provided by the respective pumps.

The types of pumps used in the present invention are not limited to centrifugal pumps. Any suitable rotating pump such as, but not limited to, regenerative type pumps can also be used.

CLAIMS

1. A pumping assembly for a drinks temperature management system, comprising a motor including drive output means which drives a plurality of pump means.

2. A pumping assembly as claimed in claim 1, used to provide a plurality of pythons (as defined herein) with chilled fluid.

3. A pumping assembly as claimed in claim 1 or 2, wherein each pump means comprises fluid input means providing fluid access to an impeller and fluid output means.

4. A pumping assembly as claimed in claim 3, wherein the fluid inlet and outlet means comprise fluid ports.

5. A pumping assembly as claimed in claim 3 or 4, wherein the drive output means is coupled to each impeller of the pump means.

6. A pumping assembly as claimed in claim 5, wherein the drive output means comprise a rotatable output drive shaft directly coupled to each impeller of the pump means.

7. A pumping assembly as claimed in claim 5, wherein at least one of the impellers is magnetically coupled to the drive means.

8. A pumping assembly for a drinks temperature management system, comprising a motor provided with two drive output means arranged to drive a plurality of pump means.

9. A pumping assembly as claimed in claim 8, wherein each drive output means is coupled to one or more of the pump means.

10. A pumping assembly as claimed in claim 9, wherein each drive output means is directly coupled to one or more of the pump means.

11. A pumping assembly as claimed in claim 9, wherein each drive output means is magnetically coupled to one or more of the pump means.

12. A pumping assembly as claimed in any one of claims 8 to 11, provided with fluid agitating means coupled to the drive output means.

13. A pumping assembly as claimed in claim 11, in combination with a fluid reservoir for housing chilled liquid, wherein said agitating means is disposed within said reservoir so as to agitate liquid therein.

14. A pumping assembly substantially as hereinbefore described, with reference to the accompanying drawings.

15. A drinks temperature management system, substantially as hereinbefore described, with reference to the accompanying drawings.